WHAT IS CLAIMED IS:

1. A method of manufacturing a semiconductor device comprising the steps of:

adding a metal element to a semiconductor film having an amorphous structure:

crystallizing the semiconductor film by a first heat treatment to form a crystalline semiconductor film;

forming an impurity region to which a noble gas element is added in the crystalline semiconductor film; and

segregating the metal element in the impurity region by a second heat treatment.

2. A method of manufacturing a semiconductor device according to claim 1, wherein the first heat treatment is performed by a rapid thermal anneal method using one heat source selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, and a carbon arc lamp.

3. A method of manufacturing a semiconductor device according to claim 1, wherein the second heat treatment is performed by a rapid thermal anneal method using one heat source selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, and a carbon arc lamp.

4. A method of manufacturing a semiconductor device according to claim 1, wherein the metal element is at least one selected from the group consisting of Fe, Ni, Co, Ru, Rh, Pd, Os, Ir, Pt, Cu, and Au.

5. A method of manufacturing a semiconductor device according to claim 1, wherein the noble gas element is at least one selected from the group consisting of helium, neon, argon, krypton, and xenon.

6. A method of manufacturing a semiconductor device comprising the steps of:

adding a metal element to a semiconductor film having an amorphous structure:

crystallizing the semiconductor film by a first heat treatment to form a crystalline semiconductor film;

irradiating the crystalline semiconductor film with laser light to improve crystallinity:

forming an impurity region to which a noble gas element is added in the crystalline

semiconductor film; and

segregating the metal element in the impurity region by a second heat treatment.

7. A method of manufacturing a semiconductor device according to claim 6, wherein the first heat treatment is performed by a rapid thermal anneal method using one heat source selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, and a carbon arc lamp.

8. A method of manufacturing a semiconductor device according to claim 6, wherein the laser light is emitted using one selected from the group consisting of an excimer laser, a YAG laser, a YVO_4 laser, or a YLF laser.

9. A method of manufacturing a semiconductor device according to claim 6, wherein the second heat treatment is performed by a rapid thermal anneal method using one heat source selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, and a carbon arc lamp.

10. A method of manufacturing a semiconductor device according to claim 6, wherein the metal element is at least one selected from the group consisting of Fe, Ni, Co, Ru, Rh, Pd, Os, Ir, Pt, Cu, and Au.

11. A method of manufacturing a semiconductor device according to claim 6, wherein the noble gas element is at least one selected from the group consisting of helium, neon, argon, krypton, and xenon.

12. A method of manufacturing a semiconductor device comprising the steps of:

adding a metal element to a semiconductor film having an amorphous structure:

crystallizing the semiconductor film by a first heat treatment to form a crystalline semiconductor film;

forming an impurity region to which a noble gas element is added in the crystalline semiconductor film; and

segregating the metal element in the impurity region by a second heat treatment: and

removing the impurity region by etching.

13. A method of manufacturing a semiconductor device according to claim 12, wherein the first heat treatment is performed by a rapid thermal anneal method using one heat source selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, and a carbon arc lamp.

14. A method of manufacturing a semiconductor device according to claim 12, wherein the second heat treatment is performed by a rapid thermal anneal method using one heat source selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, and a carbon arc lamp.

15. A method of manufacturing a semiconductor device according to claim 12, wherein the metal element is at least one selected from the group consisting of Fe, Ni, Co, Ru, Rh, Pd, Os, Ir, Pt, Cu, and Au.

16. A method of manufacturing a semiconductor device according to claim 12, wherein the noble gas element is at least one selected from the group consisting of helium, neon, argon, krypton, and xenon.

17. A method of manufacturing a semiconductor device comprising the steps of:

adding a metal element to a semiconductor film having an amorphous structure;

crystallizing the semiconductor film by a first heat treatment to form a crystalline semiconductor film;

irradiating the crystalline semiconductor film with laser light to improve crystallinity;

forming an impurity region to which a noble gas element is added in the crystalline semiconductor film; and

segregating the metal element in the impurity region by a second heat treatment; and

removing the impurity region by etching.

18. A method of manufacturing a semiconductor device according to claim 17, wherein the first heat treatment is performed by a rapid thermal anneal method using one heat source selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, and a carbon arc lamp.

19. A method of manufacturing a semiconductor device according to claim 17, wherein

the laser light is emitted using one selected from the group consisting of an excimer laser, a YAG laser, a YVO_4 laser, or a YLF laser.

20. A method of manufacturing a semiconductor device according to claim 17, wherein the second heat treatment is performed by a rapid thermal anneal method using one heat source selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, and a carbon arc lamp.

21. A method of manufacturing a semiconductor device according to claim 17, wherein the metal element is at least one selected from the group consisting of Fe, Ni, Co, Ru, Rh, Pd, Os, Ir, Pt, Cu, and Au.

22. A method of manufacturing a semiconductor device according to claim 17, wherein the noble gas element is at least one selected from the group consisting of helium, neon, argon, krypton, and xenon.

23. A method of manufacturing a semiconductor device comprising the steps of:

adding a metal element to a semiconductor film having an amorphous structure;

crystallizing the semiconductor film by a first heat treatment to form a crystalline semiconductor film;

forming a mask insulating film having an opening on the crystalline semiconductor film;

forming an impurity region to which an ion of a noble gas element accelerated by an electric field is added, through the opening in the crystalline semiconductor film; and

segregating the metal element in the impurity region by a second heat treatment.

24. A method of manufacturing a semiconductor device according to claim 23, wherein the first heat treatment is performed by a rapid thermal anneal method using one heat source selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, and a carbon arc lamp.

25. A method of manufacturing a semiconductor device according to claim 23, wherein the second heat treatment is performed by a rapid thermal anneal method using one heat source selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, and a carbon arc lamp.

26. A method of manufacturing a semiconductor device according to claim 23, wherein the metal element is at least one selected from the group consisting of Fe, Ni, Co, Ru, Rh, Pd, Os, Ir, Pt, Cu, and Au.

27. A method of manufacturing a semiconductor device according to claim 23, wherein the noble gas element is at least one selected from the group consisting of helium, neon, argon, krypton, and xenon.

28. A method of manufacturing a semiconductor device comprising the steps of:

adding a metal element to a semiconductor film having an amorphous structure;

crystallizing the semiconductor film by a first heat treatment to form a crystalline semiconductor film;

irradiating the crystalline semiconductor film with laser light to improve crystallinity;

forming a mask insulating film having an opening on the crystalline semiconductor film;

forming an impurity region to which an ion of a noble gas element accelerated by an electric field is added, through the opening in the crystalline semiconductor film; and

segregating the metal element in the impurity region by a second heat treatment.

29. A method of manufacturing a semiconductor device according to claim 28, wherein the first heat treatment is performed by a rapid thermal anneal method using one heat source selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, and a carbon arc lamp.

30. A method of manufacturing a semiconductor device according to claim 28, wherein the laser light is emitted using one selected from the group consisting of an excimer laser, a YAG laser, a YVO_4 laser, or a YLF laser.

31. A method of manufacturing a semiconductor device according to claim 28, wherein the second heat treatment is performed by a rapid thermal anneal method using one heat source selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, and a carbon arc lamp.

32. A method of manufacturing a semiconductor device according to claim 28, wherein

the metal element is at least one selected from the group consisting of Fe, Ni, Co, Ru, Rh, Pd, Os, Ir, Pt, Cu, and Au.

33. A method of manufacturing a semiconductor device according to claim 28, wherein the noble gas element is at least one selected from the group consisting of helium, neon, argon, krypton, and xenon.

34. A method of manufacturing a semiconductor device comprising the steps of:

adding a metal element to a semiconductor film having an amorphous structure;

crystallizing the semiconductor film by a first heat treatment to form a crystalline semiconductor film;

forming a mask insulating film having an opening on the crystalline semiconductor film;

forming an impurity region to which an ion of a noble gas element accelerated by an electric field is added, through the opening in the crystalline semiconductor film;

segregating the metal element in the impurity region by a second heat treatment; and

removing the impurity region by etching.

35. A method of manufacturing a semiconductor device according to claim 34, wherein the first heat treatment is performed by a rapid thermal anneal method using one heat source selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, and a carbon arc lamp.

36. A method of manufacturing a semiconductor device according to claim 34, wherein the laser light is emitted using one selected from the group consisting of an excimer laser, a YAG laser, a YVO_4 laser, or a YLF laser.

37. A method of manufacturing a semiconductor device according to claim 34, wherein the second heat treatment is performed by a rapid thermal anneal method using one heat source selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, and a carbon arc lamp.

38. A method of manufacturing a semiconductor device according to claim 34, wherein the metal element is at least one selected from the group consisting of Fe, Ni, Co, Ru, Rh, Pd, Os, Ir, Pt, Cu, and Au.

39. A method of manufacturing a semiconductor device comprising the steps of:

adding a metal element to a semiconductor film having an amorphous structure:

crystallizing the semiconductor film by a first heat treatment to form a crystalline semiconductor film;

irradiating the crystalline semiconductor film with laser light to improve crystallinity;

forming a mask insulating film having an opening on the crystalline semiconductor film;

forming an impurity region to which an ion of a noble gas element accelerated by an electric field is added, through the opening in the crystalline semiconductor film;

segregating the metal element in the impurity region by a second heat treatment: and

removing the impurity region by etching.

40. A method of manufacturing a semiconductor device according to claim 39, wherein the first heat treatment is performed by a rapid thermal anneal method using one heat source selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, and a carbon arc lamp.

41. A method of manufacturing a semiconductor device according to claim 39, wherein the laser light is emitted using one selected from the group consisting of an excimer laser, a YAG laser, a YVO_4 laser, or a YLF laser.

42. A method of manufacturing a semiconductor device according to claim 39, wherein the second heat treatment is performed by a rapid thermal anneal method using one heat source selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, and a carbon arc lamp.

43. A method of manufacturing a semiconductor device according to claim 39, wherein the metal element is at least one selected from the group consisting of Fe. Ni. Co, Ru, Rh. Pd. Os, Ir, Pt, Cu, and Au.

44. A method of manufacturing a semiconductor device according to claim 39. wherein the noble gas element is at least one selected from the group consisting of helium, neon, argon, krypton, and xenon.

45. A method of manufacturing a semiconductor device comprising the steps of:

adding a metal element to a semiconductor film having an amorphous structure:

crystallizing the semiconductor film by a first heat treatment to form a crystalline semiconductor film;

forming an island-like divided semiconductor region by etching the crystalline semiconductor film;

forming a gate insulating film and a gate electrode corresponding to the semiconductor region;

forming in the semiconductor region an impurity region to which a one conductivity type impurity element and a noble gas element are added; and

segregating the metal element in the impurity region by a second heat treatment.

46. A method of manufacturing a semiconductor device according to claim 45, wherein the first heat treatment is performed by a rapid thermal anneal method using one heat source selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, and a carbon arc lamp.

47. A method of manufacturing a semiconductor device according to claim 45, wherein the laser light is emitted using one selected from the group consisting of an excimer laser, a YAG laser, a YVO_4 laser, or a YLF laser.

48. A method of manufacturing a semiconductor device according to claim 45, wherein the second heat treatment is performed by a rapid thermal anneal method using one heat source selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, and a carbon arc lamp.

49. A method of manufacturing a semiconductor device according to claim 45, wherein the metal element is at least one selected from the group consisting of Fe, Ni, Co, Ru, Rh, Pd, Os, Ir, Pt, Cu, and Au.

50. A method of manufacturing a semiconductor device comprising the steps of:

adding a metal element to a semiconductor film having an amorphous structure:

crystallizing the semiconductor film by a first heat treatment to form a crystalline semiconductor film;

irradiating the crystalline semiconductor film with laser light to improve crystallinity;

forming an island-like divided semiconductor region by etching the crystalline semiconductor film;

forming a gate insulating film and a gate electrode corresponding to the semiconductor region;

forming in the semiconductor region an impurity region to which a one conductivity type impurity element and a noble gas element are added; and

segregating the metal element in the impurity region by a second heat treatment.

51. A method of manufacturing a semiconductor device according to claim 50, wherein the first heat treatment is performed by a rapid thermal anneal method using one heat source selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, and a carbon arc lamp.

52. A method of manufacturing a semiconductor device according to claim 50, wherein the laser light is emitted using one selected from the group consisting of an excimer laser, a YAG laser, a YVO_4 laser, or a YLF laser.

53. A method of manufacturing a semiconductor device according to claim 50, wherein the second heat treatment is performed by a rapid thermal anneal method using one heat source selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, and a carbon arc lamp.

54. A method of manufacturing a semiconductor device according to claim 50, wherein the metal element is at least one selected from the group consisting of Fe, Ni, Co, Ru, Rh, Pd, Os, Ir, Pt, Cu, and Au.

55. A method of manufacturing a semiconductor device comprising the steps of:

adding a metal element to a semiconductor film having an amorphous structure;

crystallizing the semiconductor film by a first heat treatment to form a crystalline semiconductor film;

forming an island-like divided semiconductor region by etching the crystalline semiconductor film;

forming a gate insulating film and a gate electrode corresponding to the semiconductor

region;

forming in the semiconductor region a first impurity region to which a one conductivity type impurity element is added and a second impurity region to which a one conductivity type impurity element and a noble gas element are added; and

segregating the metal element in the second impurity region by a second heat treatment.

56. A method of manufacturing a semiconductor device according to claim 55, wherein the first heat treatment is performed by a rapid thermal anneal method using one heat source selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, and a carbon arc lamp.

57. A method of manufacturing a semiconductor device according to claim 55, wherein the laser light is emitted using one selected from the group consisting of an excimer laser, a YAG laser, a YVO_4 laser, or a YLF laser.

58. A method of manufacturing a semiconductor device according to claim 55, wherein the second heat treatment is performed by a rapid thermal anneal method using one heat source selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, and a carbon arc lamp.

59. A method of manufacturing a semiconductor device according to claim 55, wherein the metal element is at least one selected from the group consisting of Fe, Ni, Co, Ru, Rh, Pd, Os, Ir, Pt, Cu, and Au.

60. A method of manufacturing a semiconductor device comprising the steps of:

adding a metal element to a semiconductor film having an amorphous structure;

crystallizing the semiconductor film by a first heat treatment to form a crystalline semiconductor film;

irradiating the crystalline semiconductor film with laser light to improve crystallinity;

forming an island-like divided semiconductor region by etching the crystalline semiconductor film;

forming a gate insulating film and a gate electrode corresponding to the semiconductor region;

forming in the semiconductor region a first impurity region to which a one conductivity

type impurity element is added and a second impurity region to which a one conductivity type impurity element and a noble gas element are added; and

segregating the metal element in the second impurity region by a second heat treatment.

61. A method of manufacturing a semiconductor device according to claim 60, wherein the first heat treatment is performed by a rapid thermal anneal method using one heat source selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, and a carbon arc lamp.

62. A method of manufacturing a semiconductor device according to claim 60, wherein the laser light is emitted using one selected from the group consisting of an excimer laser, a YAG laser, a YVO_4 laser, or a YLF laser.

63. A method of manufacturing a semiconductor device according to claim 60, wherein the second heat treatment is performed by a rapid thermal anneal method using one heat source selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, and a carbon arc lamp.

64. A method of manufacturing a semiconductor device according to claim 60, wherein the metal element is at least one selected from the group consisting of Fe, Ni, Co, Ru, Rh, Pd, Os, Ir, Pt, Cu, and Au.

65. A method of manufacturing a semiconductor device according to claim 60, wherein the noble gas element is at least one selected from the group consisting of helium, neon, argon, krypton, and xenon.

66. A semiconductor device comprising:

a crystalline semiconductor film;

a gate insulating film adjacent to the crystalline semiconductor film; and

a gate electrode adjacent to the gate insulating film,

wherein the crystalline semiconductor film comprises a channel forming region and an impurity region adjacent to the channel forming region,

wherein the impurity region is added with a one conductivity type impurity element and a noble gas element.

67. A semiconductor device according to claim 66, wherein the noble gas element is at least one selected from the group consisting of helium, neon, argon, krypton, and xenon.

68. A semiconductor device comprising:

a crystalline semiconductor film;

a gate insulating film adjacent to the crystalline semiconductor film; and

a gate electrode adjacent to the gate insulating film,

wherein the crystalline semiconductor film comprises a channel forming region, a first impurity region added a one conductivity type impurity element adjacent to the channel forming region, and a second impurity region added the one conductivity type impurity element and a noble gas element.

69. A semiconductor device according to claim 68, wherein the noble gas element is at least one selected from the group consisting of helium, neon, argon, krypton, and xenon.

70. A semiconductor device comprising:

a crystalline semiconductor film added a metal element to a semiconductor film having an amorphous;

a gate insulating film adjacent to the crystalline semiconductor film; and

a gate electrode adjacent to the gate insulating film,

wherein the crystalline semiconductor film comprises a channel forming region and an impurity region added a one conductivity type impurity element adjacent to the channel forming region,

wherein the impurity region comprises a noble gas element and the metal element at a higher concentration than the channel forming region.

71. A semiconductor device according to claim 70, wherein the metal element is at least one selected from the group consisting of Fe, Ni, Co, Ru, Rh, Pd, Os, Ir, Pt, Cu, and Au.

72. A semiconductor device according to claim 70, wherein the noble gas element is at least one selected from the group consisting of helium, neon, argon, krypton, and xenon.

73. A semiconductor device comprising:

a crystalline semiconductor film added a metal element to a semiconductor film having an amorphous;

a gate insulating film adjacent to the crystalline semiconductor film; and

a gate electrode adjacent to the gate insulating film,

wherein the crystalline semiconductor film comprises a channel forming region, a first impurity region added a one conductivity type impurity element adjacent to the channel forming region, and a second impurity region added the one conductivity type impurity element and a noble gas element, and

wherein the second impurity region comprises the metal element at a higher concentration than the channel forming region.

74. A semiconductor device according to claim 73, wherein the metal element is at least one selected from the group consisting of Fe, Ni, Co, Ru, Rh, Pd, Os, Ir, Pt, Cu, and Au.

75. A semiconductor device according to claim 73, wherein the noble gas element is at least one selected from the group consisting of helium, neon, argon, krypton, and xenon.